

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

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| 1. AGENCY USE ONLY (Leave blank) | | 2. REPORT DATE MAY 1995 | 3. REPORT TYPE AND DATES COVERED FINAL REPORT (10-94 TO 02-95) | |
| 4. TITLE AND SUBTITLE THE COMPREHENSIVE CLINICAL EVALUATION: A CASE STUDY OF THE EFFICIENCY OF PHASES II AND III OF POST GULF WAR ILLNESS EVALUATIONS AT BROOKE ARMY MEDICAL CENTER | | | 5. FUNDING NUMBERS | |
| 6. AUTHOR(S) MAJOR LAURIE S. HORN, AN | | | | |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) BROOKE ARMY MEDICAL CENTER | | | 8. PERFORMING ORGANIZATION REPORT NUMBER 3c-95 | |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) US ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL BLDG 2841 HSHA MH US ARMY-BAYLOR UNIVERSITY GRAD PGM IN HCA 3151 SCOTT ROAD FORT SAM HOUSTON TEXAS 78234-6135 | | | 10. SPONSORING/MC AGENCY REPORT | |
| 11. SUPPLEMENTARY NOTES | | | | |
| 12a. DISTRIBUTION/AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED | | | 12b. DISTRIBUTION (| |
| | | | DTIC QUALITY INSPECTED 2 | |
| 13. ABSTRACT (Maximum 200 words) This study examined the effects of the program change released in January 1995 on the efficiency of the inpatient Comprehensive Clinical Evaluation Program, Phases II and III, at Brooke Army Medical Center between October 1994 and February 1995. Attention was focused on lengths of stay, numbers of consults, and average waiting times for consults. A random sample of Post Gulf War veterans who had completed the program were chosen. Group 1 consisted of 21 patients admitted prior to the program change; Group 2, a sample of 15, were admitted after. Pearson r correlations were used to measure the correlation between variables within the groups. The correlation between length of stay and number of consults for Groups 1 and 2 were 21 and 57 percent, respectively. Analysis-of-variance was used to compare differences between group means. Mean length of stay was significantly shorter and numbers of consults significantly fewer in Group 2. These findings support the argument that medical protocols have an adverse impact on physicians' ability to manage patients on a case-by-case basis, and may cause an increase in lengths of stay, numbers of consults, and hospital costs. These data may help providers and administrators plan clinical protocols focused on case management. | | | | |
| 14. SUBJECT TERMS COMPREHENSIVE CLINICAL EVALUATION PROGRAM, GULF WAR SYNDROME, LENGTHS OF STAY, CONSULTATIONS, PROTOCOLS | | | 15. NUMBER OF PAGES 56 | |
| | | | 16. PRICE CODE | |
| 17. SECURITY CLASSIFICATION OF REPORT N/A | 18. SECURITY CLASSIFICATION OF THIS PAGE N/A | 19. SECURITY CLASSIFICATION OF ABSTRACT N/A | 20. LIMITATION OF ABSTRACT UL | |

19960911 033

U. S. ARMY-BAYLOR UNIVERSITY GRADUATE
PROGRAM IN HEALTHCARE ADMINISTRATION

THE COMPREHENSIVE CLINICAL EVALUATION PROGRAM (CCEP):
A CASE STUDY OF THE EFFICIENCY OF
PHASES II AND III OF POST GULF WAR ILLNESS EVALUATIONS AT
BROOKE ARMY MEDICAL CENTER

A GRADUATE MANAGEMENT PROJECT
SUBMITTED TO THE FACULTY OF
BAYLOR UNIVERSITY
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF HEALTH ADMINISTRATION

BY

MAJOR LAURIE S. HORN, AN

MAY 1995

ACKNOWLEDGMENTS

I wish to extend thanks to Major Lisa Miller and Ms. Connie Coleman, from Ward 43B, for their patience and assistance during the data collection process of this study. Without their help the task of chart reviews would have been impossible. I would also like to extend special thanks to my husband, Ray, who encourages me to set goals for personal and professional improvement and then guides and supports me in my effort to attain them.

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GLOSSARY

Adrenal insufficiency - acute insufficiency of the adrenal gland which is located near each kidney. The adrenal gland synthesizes and stores the three catecholamines: dopamine, norepinephrine, and epinephrine; it functions in conjunction with the sympathetic nervous system and releases these catecholamines in response to stress and emotional changes.

Amebiasis - disease characterized by dysentery with diarrhea, weakness, and prostration. Nausea, vomiting, and pain may be present. One serious complication is amebic hepatitis. Caused by ingesting food or drink containing encysted forms.

Arthralgias - pain in a joint.

Autoimmune - loss of normal tolerancy by the immune system of "self" antigens (autoantigens) on the surface of the body's cells. B cells are activated to produce autoantibodies against these autoantigens, causing the destruction of normal tissue.

Bacterial disease - a disease caused by bacteria, treated with antibiotics or sulfonamide compounds.

Benzodiazepines - a chemically similar group of psychotropic drugs with potent hypnotic and sedative action; used predominantly as antianxiety and sleep-inducing drugs.

Bipolar depression - depression in which disorders of both mood and elation are alternately present.

Brucellosis - a widespread infectious febrile disease affecting principally cattle, swine, and goats, but sometimes affecting other animals and humans.

Chronic hepatitis - Inflammation of the liver with symptoms that last for more than several months. May result in cirrhosis, or loss of functioning liver cells and increased resistance to flow of blood through the liver.

Coccidiomycosis - existing in two forms; primary, an acute self-limiting disease involving only the respiratory, organs; and progressive, a chronic, diffuse, granulomatous disease that may involve almost any part of the body.

Diabetes - a general term for diseases characterized by excessive urination. Usually refers to diabetes mellitus: which is a chronic disorder of carbohydrate metabolism. May be insulin dependent, or non-insulin dependent.

Endocarditis - inflammation of the lining membrane of the heart. Usually confined to the external lining of the valve, sometimes to the lining membrane of its chambers. May be due to invasion of microorganisms or an abnormal immunological reaction.

Endocrine disorders - disorders which effect the gland that produces an internal secretion discharged into the blood or lymph and circulated to all parts of the body. Hormones, the active principles of the gland, produce effects on tissues more or less remote from their place of origin.

Epidemiological - study of the distribution and determinants of health-related states and events in populations, and the application of this study to the control of health problems.

Fatigue - a feeling of tiredness or weariness resulting from continued activity or as a side effect from some psychotropic drug.

Fibromyalgia - chronic pain in muscles and soft tissues surrounding joints.

Gastrointestinal - pertains to the stomach and the intestine.

Giardiasis - infection with a protozoa that inhabits the small intestine of humans and other animals, attaching itself to the cells of the intestinal mucosa, from which they absorb nourishment.

Helminthiasis - having intestinal parasites or worms.

Histoplasmosis - a systemic, fungal, respiratory disease with symptoms that vary from those of a mild self-limited infection to a severe fatal disease.

HIV - Human immunodeficiency virus, a virus that causes the destruction and progressive loss of immune function.

Hypothyroidism - a condition due to deficiency of the thyroid secretion, resulting in a lowered basal metabolism.

Leishmaniasis - infection with a species of Leishmania, affecting the skin, nasal cavities, and pharynx.

Lupus erythematosus - a chronic inflammatory disease of connective tissue that causes injury to the skin, joints, kidneys, nervous system, and mucous membranes.

Lyme - a recurrent inflammatory disorder accompanied by distinctive skin lesions, erythema chronicum migrans, polyarthrititis, and involvement of the heart and nervous system.

Lymphoma - lesions or tumors involving lymphoid tissues.

Malignancy - state of growing worse, resisting treatment, said of cancerous growths. Tending or threatening to produce death.

Multiple Sclerosis - an inflammatory disease of the central nervous system in which infiltrating lymphocytes degrade the myelin sheath of nerves. It is suspected that the cause is an autoimmune disease somehow linked to a viral infection.

Myalgias - tenderness or pain in the muscles; muscular rheumatism.

Myasthenia gravis - a disease characterized by great muscular weakness and progressive fatigability. Power is restored with rest.

Neuromuscular disorders - disorders effecting the muscles and nerves.

Opiates - any drug containing or derived from opium.

Parasitic diseases - diseases that are caused by an organism that lives within, upon or at expense of another

organism, known as the host, without contributing to survival of the host.

Pathology - study of the nature and cause of disease, which involves changes in structure and function. Condition produced by disease.

Psychosis - a term formerly applied to any mental disorder, but now generally restricted to those disturbances of such magnitude that there is personality disintegration and loss of contact with reality. The disturbances are of psychogenic origin, or without clearly defined physical cause or structural change in the brain. they usually are characterized by delusions and hallucination, and hospitalization generally is required.

Psychotic depression - psychosis characterized by extreme depression, melancholia, and feelings of unworthiness.

Rheumatoid arthritis - form of arthritis with inflammation of the joints, stiffness, swelling, cartilaginous hypertrophy, and pain.

Sarcoid - resembling flesh, a small epitheloid tubercle-like lesion characteristic of sarcoidosis.

Sarcoidosis - a disease of unknown etiology characterized by widespread lesions that affect any organ or tissue of the body.

Schizophrenia - a group of related disorders of unknown etiology in which there is a special type of disordered thinking, affect, and behavior.

SLE - systemic lupus erythematosus. See lupus erythematosus.

Somatoform disorders - a group of disorders in which there are symptoms of a disease but no evidence of a physical disorder to explain the symptoms.

TB - tuberculosis, an infectious disease characterized pathologically by inflammatory infiltrations, formation of tubercles, caseation, necrosis, abscesses, fibrosis, and calcification of the respiratory system.

Toxin - a poisonous substance of animal or plant origin.

Ulcerative colitis - ulceration of mucosa of colon.

Wegener's - a rare condition characterized by lesions of the respiratory tract, and kidney infection.

ABSTRACT

The purpose of this study was to examine the effects of the program change released in January 1995 on the pre- and post-efficiency of the inpatient Comprehensive Clinical Evaluation Program (CCEP), Phases II and III, at Brooke Army Medical Center (BAMC) between October 1994 and February 1995. Particular attention was focused on lengths of stay, numbers of consults, and average waiting times incurred for each consult. A random sample of 36 Post Gulf War veterans who had completed Phases II and III of the inpatient CCEP program at BAMC from October 1994 through February 1995 were chosen for this study. The sample was broken into two groups. Group 1 consisted of 21 patients who were admitted prior to the program protocol changing in January of 1995. Group 2, with a sample size of 15, were those patients admitted after the change. Standard Pearson r correlations were used to measure the correlation between two or more variables within the groups. The correlation between length of stay and number of consults for Groups 1 and 2 were 21 and 57 percent, respectively. Analysis-of-variance was used to determine if there were statistically significant differences found between the means of the two groups. The mean length of stay was significantly shorter and numbers of consults significantly fewer in Group 2 than in Group 1. These findings lend support to the argument that medical protocols have an adverse impact on physicians' ability to manage patients on a case-by-case basis, and may cause an increase in lengths of stay, numbers of consults, and hospital costs. These data may help providers and administrators better plan clinical protocols that are more focused on case management and that better take into account the cost savings possible by allowing providers to use their expertise in the diagnosis and treatment of patients.

CHAPTER 1

INTRODUCTION

Conditions Which Prompted the Study

Issues Impacting Upon the Health of Persian Gulf War Veterans: Important Historical Factors

From August 1990 through February 1991, approximately 696,560 Americans were deployed in the Persian Gulf War.¹ After their return, an increasing number of Persian Gulf War (PGW) veterans reported developing illnesses which they attributed to service in the Gulf War. As of March 1994, 200 active duty soldiers and 1000 Reservists/veterans reported experiencing unknown illnesses with symptoms ranging from generalized fatigue to gastrointestinal disturbance, muscle and/or joint pain, headache, memory loss, irritability, difficulty concentrating, and debility that prevents routine activities.² The numbers continued to increase and by November, 1994, as many as 1200 PGW veterans

¹U.S. Navy, Bureau of Medicine and Surgery, Summary of the Issues Impacting Upon the Health of PGW Veterans, June 1994, 1.

²Ibid.

in the Tricare Region VI area alone (Texas, Oklahoma, and part of Louisiana) had reported such illnesses.³ Many of the reports included combinations of these nonspecific symptoms, as well as rashes and lung disorders.

A National Institutes of Health (NIH) Technology Workshop draft report concluded that "the symptoms reported by some veterans are multisystemic, often unassociated with objective signs of pathology, and not easily distinguished from other multisystem symptom complexes that have been described such as chronic fatigue, fibromyalgia, somatiform disorders, and other symptoms such as intolerance to environmental chemicals."⁴ Walter Reed Army Medical Center staff developed a provisional case definition in an attempt to characterize a specific syndrome, known as Gulf War Syndrome, Post Gulf War Syndrome, or Persian Gulf War Illness (Appendix A).

As of February 1994, The Department of Defense (DOD) was not aware of any reports of PGW veterans dying suddenly of mysterious causes. Since that time, DOD has learned that

³ Dr. Gregg Anders, CCEP Program Director, interview by author, 1 November 1994, Austin, Texas.

⁴ Assistant Secretary of Defense for Health Affairs, Memorandum: PGW Illnesses Comprehensive Clinical Evaluation Program, 7 June 94, (Atch 1, Section B).

some PGW veterans have died but investigators did not feel the deaths could be attributed to service in the Persian Gulf. Nonetheless, DOD initiated an epidemiological evaluation of casualty data to identify potential patterns of causes of death among PGW veterans.⁵

Unexplained Illnesses Among Desert Storm Veterans: A Search
for Causes, Treatment, and Cooperation

A report released by the Persian Gulf War Veterans Coordinating Board in June 1994 reviewed the clinical presentation and potential causes of the illnesses among PGW veterans in an attempt to form a basis for further lines of investigation. The report focused on the risks of and possible reactions to prophylactic drugs and vaccines, infectious diseases, and exposures to chemicals, radiation, and smoke from oil fires. The Coordinating Board concluded that all potential causes for the health problems experienced by PGW veterans were investigated and that no single cause had been found that might explain those problems. They recommended patience on the part of the public and the veterans, as no "quick" answers were available. Rather, the Board concluded, the answers would

⁵U.S. Navy, Bureau of Medicine and Surgery, Summary of the Issues Impacting Upon the Health of PGW Veterans, June 1994, 2.

be provided through intense cooperation between the various government branches, medical researchers, and physicians.⁶

At about the same time the Coordinating Board was releasing its report, the media was directing the public's attention toward the "Gulf War Syndrome."⁷ The media thrust was that our service men and women may have brought home some mystery illness. The intense coverage rekindled memories of the manner in which DOD handled problems with Agent Orange. Nationwide, this issue was becoming a political "hot potato."

Treating Health Problems of PGW Veterans

In light of the intense media coverage of PGW veterans with mysterious illnesses, the Assistant Secretary of Defense for Health Affairs (ASD[HA]), Dr. Stephen Joseph, insisted that the DOD "better address [the PGW veterans] medical problems." Accordingly, in May 1994, Dr. Joseph established a more comprehensive clinical diagnostic program. This program represented the DOD's efforts to

⁶ Persian Gulf Veterans Coordinating Board, *Unexplained Illnesses among Desert Storm Veterans: A Search for Causes, Treatment, and Cooperation*, Washington, D.C.: Support Office of the Veterans Coordinating Board, June 1994.

⁷ I.B. Milner, Letter to the Editor, Journal of the American Medical Association 271:9 (March 2 1994): 661.

identify PGW veterans who, despite reportable symptoms, did not have clearly defined diagnoses and to offer them an intensive medical examination aimed at finding the causes of their symptoms.⁸

The Veteran's Administration, who were also trying to diagnose and treat PGW veterans, set forth standardized clinical assessments for its special referral centers just prior to June 1994.⁹ Based on this clinical protocol, the ASD[HA] initiated the Comprehensive Clinical Evaluation Program (CCEP) for PGW veterans.¹⁰

Comprehensive Clinical Evaluation Program (CCEP): Phase I, II, and III Evaluations

The CCEP program for evaluating PGW veterans was designed so that clinical staff at Tricare Regional Medical Centers (TRMCs) could evaluate referred patients. The three phase evaluation process provided a framework for diagnostic

⁸ Office of the Assistant Secretary of Defense for Health Affairs, Memorandum: Medical Evaluation of Personnel Experiencing Unexplained Health Problems Following Service in the Persian Gulf War, 11 May 94

⁹ J.T. Farrar, Under Secretary for Health Information Letter. Medical Care Programs for Persian Gulf Veterans, Including Comprehensive Clinical Examination Protocol, June 17, 1994. Washington, D.C.

¹⁰ Institute of Medicine, Committee to Review the Health Consequences of Service During the Persian Gulf War, Washington D.C.: National Academy Press, 1995.

evaluation. Regardless of whether symptoms were included in the prescribed protocol, all reported symptoms were thoroughly assessed and clinically evaluated. The CCEP referral protocol algorithm, located at Appendix B, represents an overview of the clinical evaluation process.

Phase I Evaluation

The Phase I evaluation was designed to confirm diagnoses for individuals already in the Persian Gulf Veterans Health Surveillance System (PGVHSS). All individuals in the PGVHSS database prior to 31 May 1994, were referred to the appropriate TRMC for inpatient evaluation using the Phase I procedures of the CCEP protocol. Those individuals entered into the database after 31 May 1994 were evaluated at their closest Medical Treatment Facility (MTF).¹¹

Initial evaluations by the TRMC were done on an inpatient basis. Consisting of a records review, medical history interview, exposure history, and baseline physical examination, this process was reported to have lasted approximately three hours.

¹¹ Assistant Secretary of Defense for Health Affairs,
Memorandum: PGW Illnesses Comprehensive Clinical
Evaluation Program, 7 June 94 (Atch 1, Section B).

All patients who had definitive diagnoses consistent with their complaints, and which explained their Persian Gulf related health concerns required no further evaluation within the CCEP. Alternatively, individuals whose complaints were not explained to either the health care providers' or patient's satisfaction were evaluated at the appropriate TRMC using CCEP protocol Phase II procedures.¹²

Phase II Evaluation

The Phase II evaluation consisted of supplemental baseline laboratory tests and consultations (Appendix C). If, based upon those Phase II test results, a patient had a definitive diagnosis which was consistent with their complaints and explained their Persian Gulf related health concerns, they required no further evaluation within the CCEP. However, in those cases where individuals whose complaints were not explained to either the health care providers' or the patient's satisfaction were then further evaluated using Phase III procedures of the CCEP protocol.¹³

¹² Ibid.

¹³ Ibid.

Phase III Evaluation

According to the CCEP referral protocol, Phase III evaluations (Appendix D) consisted of special case-by-case evaluations. Researchers and physicians found that some patients undergoing Phase II or Phase III examinations were diagnosed with definable, conventional conditions which may or may not be related to Persian Gulf service (e.g., sarcoidosis, lupus erythematosus, leishmaniasis, ulcerative colitis, etc.).¹⁴

To aid researchers in their quest for answers, following the clinical evaluations, physicians were to forward copies of all pertinent medical records to the Navy Medical Information Management Center (NMIMC). In addition, clinical staff were to forward all microscopic slides to the Armed Forces Institute of Pathology (AFIP).

Plan for Increasing CCEP Evaluations

On 23 September 1994, the U.S. Army Medical Command notified the Commanders at all Health Service Support Areas (HSSA) of a tasking from the ASD[HA] to increase the number of CCEP Phase II and III evaluations by a factor of four. For Brooke Army Medical Center (BAMC), that meant an

¹⁴ Ibid.

increase of about 30 inpatients per week. The ASD[HA]'s guidance included instructions that the increase of CCEP evaluations would not impact on the care currently being provided to other beneficiaries.¹⁵ Implementation of the plans for increasing CCEP evaluations was to take place by 28 September 1994. This increase in patient load resulted in BAMC consolidating the CCEP patients onto one ward. Due to physical constraints, BAMC was unable to begin implementation of the new directive until 24 October 1994.

In January 1995, the ASD[HA] revised the CCEP program protocols based on studies published by the Defense Science Board and the Institute of Medicine which found that most PGW veterans had been diagnosed with "relatively common, diagnosable, and treatable conditions."¹⁶ Due to the large numbers of PGW veterans needing evaluations, the ASD(HA) determined that a larger proportion of CCEP clinical assessments would be conducted at the local MTFs. Other revisions included changing and/or reducing the types of laboratory tests and consultations necessary for each phase of the evaluation process. The entire CCEP program adopted

¹⁵ Major Michael Brennard, CCEP Program Administrator, interview by author, 23 September 1994, Washington D.C.

¹⁶ Assistant Secretary of Defense for Health Affairs, Memorandum: Revision of the Comprehensive Clinical Evaluation Program, 5 January 95.

a more clinically-focused approach, placing more emphasis on case management. The new program became one that stressed the importance of the primary care provider rather than one that was specialty oriented and strictly protocol driven.¹⁷ Fewer local CCEP patients were admitted and more consultations were conducted on an outpatient basis for all CCEP patients, thus creating more inpatient space.

Environmental Factors

Factors to be considered in the plan to increase CCEP evaluations included the numbers of physician providers and support personnel assigned to the CCEP program. Another factor to consider was the impact that increased appointments for consultations by other services, magnetic resonance imaging (MRI), lab tests, radiographic studies, and other diagnostic procedures would have on the rest of the hospital.

To increase the patient load four-fold meant that BAMC had to reopen a ward that had previously been closed. Reopening the ward not only required staffing the unit 24 hours a day, but included logistic support for supply and equipment requirements as well as support in the areas of

¹⁷ Ibid., Attachment, 10-1.

communications, dietary, pharmacy, Patient Administration Division (PAD), linen, housekeeping, and other ancillary services.

Limitations Surrounding The Situation

Although the HSSAs were required to submit cost estimates for increasing their CCEP programs, resources necessary to accomplish such a task were becoming a concern. The Medical Expense and Performance Reporting System (MEPRS) was showing cost averages of \$777 per occupied bed day for the CCEP inpatients. In fact, not including the costs for the various consults and procedures, each patient admitted to the CCEP ward was costing BAMC an average of \$9712 per admission.¹⁸

Realizing the ASD(HA)'s commitment to expeditiously diagnose and treat PGW veterans, there was increasing concern with the numbers of patients awaiting Phase II and III evaluations. The backlog of Phase I patients had already been identified as approximately 850 and was expected to grow. The program's administrator anticipated

¹⁸ Resource Management Division, Brooke Army Medical Center, Summary Report - Manpower Analysis, Medical Expense and Performance Reporting System (MEPRS), 23 February 1995.

it would take approximately six months to move presently identified CCEP patients through all three phases of the process. Without knowledge of how many more PGW veterans would enroll in the program it was impossible to determine how long the CCEP program would have to continue to accomplish all necessary evaluations.¹⁹

Description of the Program

As a result of the ASD[HA] tasker to the HSSAs, the CCEP program was housed on a 20 bed ward. The nursing staff consisted of one military headnurse, and one military wardmaster, with the remaining staff made up of contract nurses, both Registered Nurses and Licensed Practical Nurses. Two Internal Medicine physicians were assigned to evaluate CCEP patients as they were admitted to the program.²⁰

The purpose of admitting patients to the unit for Phase II and III testing and evaluation was to allow evaluating

¹⁹ Major Michael Brennand, CCEP Program Administrator, interview by author, 24 October 1994, Fort Sam Houston, Texas.

²⁰ Major Lisa K. Miller, Headnurse, Ward 43B (CCEP), interview by author, 12 April 1995, Brooke Army Medical Center, Fort Sam Houston, Texas.

physicians to "close the loop on each patient."²¹ During their admission, inpatients on the CCEP ward were ambulatory, performing their own activities of daily living, went to the dining facility for meals, and were permitted to leave the hospital for extended periods of time on pass. This level of activity for a patient generally places them in a Category I status of the Workload Management System for Nurses; the least labor-intensive acuity level.

Defining The Population

The outline for who was being seen through the CCEP program was very specific. PGW veterans on active duty or retired, members on full-time National Guard duty who were PGW veterans, PGW veterans who were members of the Ready Reserve, family members of such personnel, and DOD Civilians who served in the Persian Gulf were eligible beneficiaries within the Military Health Services System (MHSS) and were all entitled beneficiaries eligible for CCEP referral evaluations.

MTF staff referred PGW veterans who had separated from active duty service and who were not eligible beneficiaries

²¹ Major Steven A. Older, CCEP Program Physician, interview by author, 12 April 1995, Fort Sam Houston, Texas.

to the nearest Department of Veterans Affairs (VA) hospital for screening evaluations, except for those PGW veterans identified in the Surgeons' General data bases as of 31 May 1994.

Patient Flow Process

Upon completion of Phase I evaluation, patients identified as needing Phase II and III evaluation were referred by their evaluating MTF to the TRMC responsible for their evaluation. In this case, BAMC accepted patients requiring further CCEP evaluation from Ft. Polk, Louisiana; Ft. Sill, Oklahoma; Ft. Hood, Texas; and potentially the MTF located in Panama.

The individual MTFs were responsible for contacting BAMC's CCEP personnel and notifying them of the patients requiring further evaluation in Phases II and III. The administrative assistant for the CCEP program made contact with the patients to arrange admission to BAMC's CCEP ward. The patients, the majority of whom were active duty, would proceed TDY to BAMC for the required hospital admission.²²

Arrangements for air evacuation were made at the referring MTF, and upon admission to the ward, the patient

²² Ibid.

was seen by a physician. The physician conducted an initial physical evaluation and ordered consultations for the patient based on the CCEP protocol outlined in Appendix C.²³ Each consult entailed a one-time request for consultation by a particular service, with the exception of Psychology consults which potentially consisted of a series of five consults varying from one to eight hours in length.

The process of scheduling the patient for the various consultations was accomplished by ward personnel calling the various clinics, or transferring the referral slips directly to the clinic. Ward personnel were contacted with the date and time of each patient's appointment. Upon completing all necessary consults, return consults, and diagnostic procedures, patients were either identified for further treatment or discharged.

Statement of the Problem

Over 1200 PGW veterans needing CCEP evaluation had been identified in the Tricare Region VI area. By February 1995, approximately 95 of those in need of referral had undergone inpatient Phase II and III evaluations.²⁴ At that point,

²³ Ibid.

²⁴ Lieutenant Colonel Gregg Anders, CCEP Program Director, interview by author, 1 November 1994, Austin, Texas.

there was no way to know how many more PGW veterans would require hospitalization for evaluation. The ASD[HA]'s mandate to increase completion of evaluations at four times the previous rate placed an incredible burden on an already stressed system.²⁵ Without changing the CCEP protocol, it appeared as though the BAMC CCEP program would not be able to meet the demands of an increased workload.

BAMC's CCEP administrator was anxious to stay on target and began to look more closely at how BAMC might increase the efficiency of its program. Based upon a precursory examination, lengths of stay appeared excessive. Consultations were being accomplished as clinic visits, during weekdays, with the patients leaving the hospital on pass during the evenings and on weekends, particularly those patients who lived in the immediate area. This resulted in wasted inpatient space.

In accordance with the protocol set forth for evaluation of the CCEP patients, many consults and procedures that are considered "big ticket" items for cost accounting purposes were required.²⁶ Bottlenecking in key

²⁵ Brennand, 23 September 1994.

²⁶ Robert L. Braham and others, "Diagnostic Test Restraint and the Specialty Consultation," Journal of General Internal Medicine 5:2 (March/April 1990): 96.

areas, such as Psychiatric and Psychology examinations, was slowing the entire process down to a point that it appeared as though the ASD[HA]'s mandate could not be met.

Literature Review

Trends: Comparing and Contrasting

Many researchers have studied the utilization of diagnostic testing in relation to lengths of stay and hospital costs.²⁷ Although physicians involved with the CCEP program were bound by protocol, studies show that pressure from consultants cause physicians to order more tests than they normally would have if they had been practicing independently. Further, these studies have shown that the performance of specialty consultations and procedures can double hospital costs and lengths of stay.²⁸

In the early 1980's, researchers were finding substantial evidence of unnecessary medical use, the most overused being the ordering of diagnostic testing. Upwards

²⁷ Ibid., 95.

²⁸ Ibid., 101.

of 43 percent of laboratory tests have been found to be unnecessary in retrospective reviews of medical records.²⁹

Many research studies have been built on the premise that physicians overutilize medical care as a result of their personal interest and desire for higher incomes. Physicians have also been shown in the literature to be driven to medical overuse by what they believe to be the patients' best interest.³⁰ The latter is probably more of a driving factor in MTFs in light of the fact that there is little personal gain in the overutilization of medical care by individual military physicians.

As well as trying to find an answer for the patients, the political nature of this program played a part in the make-up of the protocol. The necessity to avoid as much uncertainty in diagnosing the PGW veteran's medical problems as was possible lent itself to the creation of a protocol that extensively involved consultations and specialty procedures. This resulted in an increase in the numbers and types of diagnostic procedures performed.

²⁹ John M. Eisenberg, Doctors' Decisions and the Cost of Medical Care (Ann Arbor, Michigan: Health Administration Press Perspectives, 1986), 10.

³⁰ Ibid., 57.

In 1991, Mattingly described clinical decision making or "clinical reasoning" as more than the application of theory because patient care must be individual and may require adjustments based on medical expertise.³¹ In a report released by the Defense Science Board Task Force on Persian Gulf War Health Effects in June of 1994, the Board recommended that in the absence of a proven etiology, clinical treatment should be managed on a case-by-case basis and directed at the patients' symptoms. This recommendation was based on the conclusion that epidemiological evidence had yet to present any support for the presence of a "Gulf War Syndrome".³²

Reorganizing How Healthcare Is Provided

More frequently the healthcare industry is exploring the use of tools designed to guide better management of inventories, scheduling systems, and optimizing the way organizations meet demands. Although most of these tools are designed for manufacturing goods or finished products,

³¹ Cheryl Mattingly, "What is Clinical Reasoning?" The American Journal of Occupational Therapy 45:11 (November 1991): 979.

³² Defense Science Board, Final Report: Defense Science Board Task Force on Persian Gulf War Health Effects, Washington, D.C.: Office of the Under Secretary of Defense for Acquisition and Technology, June 1994, 3.

they can be adapted for use in health care delivery systems.³³

Other industries such as airlines, banking, and hotels have recognized the need to maintain service-oriented organizations if they expect to survive in the long run. They, unlike most healthcare organizations, realize there are inherent risks that must be taken in order to achieve the benefits of improved customer service, operations, and overall efficiency.³⁴ In the past, the health care industry generally thought of itself as different from others because of its goals and missions, ignoring the strategies being practiced in other fields. In order for health care executives to successfully lead their organizations, they must begin looking at the similarities between their business and general industry.³⁵

Many health care organizations have embraced the concept of reengineering how they deliver care to their patient population. Still in its infancy, reengineering

³³ David M. Rhyne and David Jupp, "Health Care Requirements Planning: A Conceptual Framework," Health Care Management Review 13:1 (Winter, 1988): 19.

³⁴ Jill L. Sherer, "Are There Lessons to be Learned From Other Industries? Strategy by Analogy," Hospitals and Health Networks 68:12 (June 20 1994): 59.

³⁵ Ibid., 58.

offers health care providers the opportunity to recreate their organizations to improve the quality of patient care, reduce costs, and create more efficient, streamlined operations.³⁶ This concept, originally applied to industry, has been adopted for use in health care-specific clinical processes. Changing the way patients move through the system, redesigning jobs, and making the system work for the patient are only some of the outcomes being seen as a result of the application of reengineering philosophy in health care.³⁷ To begin this process, a firm understanding of how medical care is being provided and what can be done to improve it must be attained.³⁸

Changing the way physicians are taught to practice medicine was the focus of a study by Manheim and others in 1990. These researchers found that the current cost-containment environment is more conducive to physicians learning to practice more efficaciously than their

³⁶ Rhonda Bergman, "Reengineering Health Care: A New Management Tool Aims to Transform the Organizational Processes--and Stir Discussion," Hospitals and Health Networks 68:3 (February 5 1994): 28.

³⁷ Rhonda Bergman, "New Processes...New Info System: Clinic Uses Reengineering to Pave the Way for Better Patient Care," Hospitals and Health Networks 68:3 (February 5 1994): 30.

³⁸ Eisenberg, 165.

predecessors.³⁹ Changing the way physicians practice medicine today is beginning to produce a more intense, efficient style of medical practice.⁴⁰ This efficient, new style may reflect changes in medical care that could be defined as producing effectively with a minimum of waste, expense, or unnecessary effort.⁴¹ These efficiencies are the basis for the reorganization of the delivery of patient care in healthcare today.

Purpose

The purpose of this study was to examine the effects of the program change released in January 1995 on the pre- and post-efficiency of the inpatient CCEP program, Phases II and III, at BAMC between October 1994 and February 1995. Particular attention was focused on lengths of stay, numbers of consults, and average waiting times incurred for each consult.

³⁹ Larry M. Manheim and others, "Training House Officers To Be Cost Conscious," Medical Care 28:1 (January 1990): 29.

⁴⁰ Eisenberg, 44.

⁴¹ Carolyn F. Waltz and Susan B. Bond, "How Can a Program Evaluation be Comprehensive and Yet Cost Efficient?" Journal of Nursing Education 24:6 (June 1985): 258.

CHAPTER 2

METHODS AND PROCEDURES

Sampling Procedures

A random sample of the population was chosen from those PGW veterans who had completed Phases II and III of the inpatient CCEP evaluation at BAMC from October 1994 through February 1995. The total number in the population was 95. A sample of 36 PGW patients was chosen for this study. The sample size was such as to attain the statistical confidence level of 95 percent at the desired level of precision of 1.5 days.⁴² A method of systematic sampling was employed, choosing patients based on the last digit of their admission number, and therefore the sample was treated as one that was simple and random.⁴³ Sampling was done without replacement, to disallow recording data on a single patient twice.⁴⁴

⁴²William C. Emory and David R. Cooper, Business Research Methods (Boston: Richard D. Irwin, Inc., 1991), 261.

⁴³Ibid., 265.

⁴⁴Wayne W. Daniel, Biostatistics: A Foundation For Analysis in the Health Sciences, 3rd ed. (New York: John Wiley and Sons, Inc., 1983), 95.

Means of Data Gathering

The primary method of data collection was accomplished on the ward through retrospective chart audits. Also collected, was information from personal interviews with the physician providers and the headnurse. The types of data collected after discharge included the lengths of stay for patients undergoing Phase II and III CCEP evaluations; the types of consults ordered; and the dates each of the consults and diagnostic procedures ordered for each patient were accomplished. From this data, the average length of stay for each inpatient, mean wait times for each inpatient consultation and diagnostic procedure, plus the services most consulted on an inpatient basis were determined.

A Comparative Analysis

Once the mean wait times, length of stay, and most frequently consulted services were determined, the sample was broken into two groups: those patients admitted prior to the change in the program in January 1995, and those who were admitted after the change took effect. The data from the first group was then compared to the second group and the statistical analysis of difference between means examined.

Type Of Data Analysis Employed

Initially, exploratory data analysis was employed in an attempt to provide the researcher with the flexibility to respond to the patterns of the discovery process. This method relies on visual representations and graphical techniques for preliminary analysis.

Once a pattern was established, confirmatory analysis was used to evaluate the strength of what was found.⁴⁵ In this study the coefficient of determination was used to measure the correlation between two or more variables within groups in an attempt to account for shared variance.

A simple analysis-of-variance design, ANOVA, was used to determine if there were any statistically significant differences found between the means of two groups, those admitted prior to the redesign of the CCEP program, and those admitted after.⁴⁶ The resulting values for the group differences were used to support the idea that the change in the CCEP program resulted in shorter lengths of stay and fewer consultations.

⁴⁵ Emory, 469.

⁴⁶ Chris Spatz and James O. Johnston, Basic Statistics: Tales of Distributions, 4th ed. (Pacific Grove, California: Brooks/Cole Publishing Company, 1989), 189.

Limitations of the Study

Studies have shown that unnecessary hospital days can be attributed to patients awaiting discharge.⁴⁷ The sample used for this study included patients who came from other locations and may have required air evacuation to return home. Only one chart contained the necessary documentation to reflect a two day lapse between the last consult and discharge to home via air evacuation. Five other cases may have encountered the same type of lag time as well, although that fact is not documented. It may have been possible to control for variation between the two groups by subtracting the unnecessary days patients spent waiting for transportation from the lengths of stay.

Ethical Considerations

No human participants were used in this study that might have made it necessary to obtain informed consent for data collection. The medical records review was conducted through the use of admission numbers, and was therefore considered relatively anonymous, known only to the researcher for the initial collection of data.

⁴⁷ Walter Baigelman, Leisa Weld and John S. Coldiron, "Relationship between Practice Characteristics of Primary Care Internists and Unnecessary Hospital Days," American College of Medical Quality 9:3 (Fall 1994): 124.

CHAPTER 3

RESULTS AND MAJOR FINDINGS

Of the 36 patients for whom data were collected, 21 were admitted prior to the program change on 17 January 1995 (Group 1), and 15 were admitted after (Group 2). Appendix E shows a frequency distribution for lengths of stay for each group. In Group 1, more than 75 percent of patients stayed longer than 14 days. Group 2 had much shorter lengths of stays, with almost 75 percent of patients being discharged in less than 14 days.

Table 1 summarizes the sample size and descriptive statistics for the length of stay, in days, for each group and the sample as a whole.

Table 1--Sample size and descriptive statistics for lengths of stay

| | μ | σ | n |
|---------|-------|----------|----|
| Group 1 | 17.86 | 8.82 | 21 |
| Group 2 | 12.13 | 6.24 | 15 |
| All | 15.47 | 8.26 | 36 |

The difference between the two group means, 5.81 days, represents a 33 percent reduction and is statistically significant ($p < .05$, 34 df).

In Group 1, the number of consults received by patients ranged from 2 to 24, the mean being 16. In Group 2, consults ranged in number from 6 to 22, with a mean of 12. The reduction in the mean number of consults represents a 25 percent decrease for Group 2 and was found to be significant ($P < .05$, 34 df). Table 2, below, represents comparative data for lengths of stay and the numbers of consults.

Table 2.--Mean length of stay and number of consults

| | Group 1 | Group 2 | All |
|--------------------------|---------|---------|-------|
| μ Length of Stay | 17.86 | 12.13 | 15.47 |
| μ No. of Consults | 16.42 | 12.33 | 14.72 |

Neurology, Psychology (first visit), Dental, Infectious Disease, Psychiatry, Psychology (second visit), Gastrointestinal, and Psychology (third visit) were consulted for more than 50 percent of the patients. Services receiving consults for more than 30 percent of the

patients for both groups are depicted in the graph at Appendix F. All services showed a decrease in the percent of consults received for Group 2 with the exception of laboratory testing and colonoscopies which were ordered more frequently.

The table located at Appendix G presents the average waiting times for appointments in those services that received consultations on at least 30 percent of the patients. Listed on the table are the means and the standard deviations for the wait (in days) from the date of admission to the appointment date encountered by each group and the sample as a whole. The average wait in days for consultations for both groups is displayed, by service, at Appendix H.

In the first group, Psychology 2, Psychology 3, and Psychiatry were the three services that had been consulted for more than 50 percent of the patients and that had the longest wait times, 10-15 days. In the second group, the numbers of consults received by Psychiatry dropped from 71 percent to 47 percent of CCEP patients, however the mean waiting time for consultations increased from 10 days to 13 days. Psychology (second visit) saw fewer patients, a decrease from 67 percent to 13 percent, and reduced

consultation waiting time by 3 days to an average of 10. The numbers of consults and therefore the consultation waiting time for Psychology (third, fourth, and fifth visit) were eliminated entirely for Group 2.

An analysis of variance showed a positive correlation between the length of stay and the number of consults in Group 1 ($p < .05$, 20 df), however the two only shared 21 percent of variance. Length of stay was also positively effected by the number of consults in Group 2 ($p < .001$, 13 df), with a much higher shared variance of 57 percent.

A shared variance of greater than 52 percent between the independent variables Psychiatry, Psychology 1,2,3,4,5, and the dependent variable lengths of stay was found in Group 1. Since there were no inpatient consults in Psychology 3, 4, and 5 conducted for Group 2, it was impossible to conduct an analysis of the variance shared between those variables and length of stay.

CHAPTER 4

CONCLUSIONS

The idea, as expressed by Kassirer, that in the diagnostic process "our task is not to attain certainty, but rather to reduce the level of diagnostic uncertainty enough to make optimal therapeutic decisions" might have served to explain why studies were showing that "Desert Storm Illness" was not emerging as a primary diagnosis on PGW veterans.⁴⁸ By allowing the providers the opportunity to practice case management, ASD(HA) enabled them to reduce "diagnostic uncertainty" rather than trying to find "absolute certainty." Changing the focus of the CCEP program to one that was more clinically-oriented and provider-driven significantly lowered the number of consults, which in turn effected the lengths of stay and reduced overall cost.

Redesigning the protocol by which PGW veterans were evaluated provided a basis for adjustments that reduced bottlenecking in the areas of Psychiatric and Psychology

⁴⁸Jerome P. Kassirer, "Our Stubborn Quest for Diagnostic Certainty," The New England Journal of Medicine 320:22 (June 1, 1989): 1489.

consults. Eliminating the consultation waiting times for the third, fourth, and fifth Psychology appointments played a large part in reducing the mean lengths of stay for Group 2. Also playing a part in reducing lengths of stay for that group was the decrease in the mean number of consultations that each patient received. Potentially by shortening the lengths of stay per patient, more PGW veterans had earlier access to the last two phases of their evaluation thereby allowing BAMC to meet the program guidelines of expeditious evaluation and diagnosis.

Although not a major focus, this study was able to show a cost savings associated with the change in protocol. The difference in lengths of stay potentially represented a cost savings to the hospital of \$3885 per patient during Phase II and III evaluations. This figure neither includes the cost savings made possible by fewer consultations, nor the strong possibility that fewer diagnostic tests were generated as a result of fewer consults. Adding in those avoided costs would no doubt increase the overall savings for each patient.

Considering such small samples in each group, caution must be taken in the extent to which the data may be used to generalize about a population. The findings are consistent,

however, with the aforementioned studies that found increasing numbers of consults do lead to longer lengths of stay. The small samples also make slight differences in the data between each group appear larger, or smaller, when reported in percentages. For instance, in the second group, the percentage of diagnostic procedures performed increased from 86 percent in Group 1 to 100 percent in Group 2. This, however, only represented a total of 3 patients.

Another issue that deserves discussion is that of unnecessary inpatient days caused by an excessive hospital pass policy and the patients' need for transportation back to their homes or duty stations. The data for those incidents were not collected and may have impacted on the findings of this study. Six patients from Group I had potential for lengths of stay being driven up artificially due to the need for transportation. Also in that group, numerous hospital passes were issued to inpatients during their hospital admissions. Reduction of these variables in Group 2 probably accounts for the stronger shared variance between lengths of stay and number of consults in that group.

Lastly, during the retrospective chart audits, documentation was found to be less than optimal. On

occasion, entries were illegible or hard to interpret due to improper correction of errors. More frequently, dates for appointments and completion of consults were found missing from the non-medication therapeutic documentation sheets.

In conclusion, the findings from this study lend support to the argument that comprehensive medical protocols have an adverse impact on physicians' ability to manage patients on a case-by-case basis, and may cause an increase in lengths of stay, numbers of consults, and hospital costs. These data may help providers and administrators better plan clinical protocols that are more focused on case management and that better take into account the cost savings possible by allowing providers to use their expertise in the diagnosis and treatment of patients.

CHAPTER 5

RECOMMENDATIONS

At its inception, it might have been more beneficial to providers and patients alike to have allowed each MTF conducting Phase II and III evaluations of the CCEP program to make adjustments to best serve their patients. In that manner, each facility might have been able to avoid potential impact on the provision of care to other beneficiaries. Conducting studies that examine how CCEP programs did, in fact, impact other beneficiaries would prove beneficial.

Also of interest would be research examining the effects of the change in the program on the lengths of stay and numbers of consults on other MTFs. That information could be used to compare program outcomes from facilities within the Army Medical Department, DOD, or the entire federal sector.

With quality being of major concern in medicine today, the outcome of each patient's evaluation in relation to length of stay and number of consults might have been taken into account. This study did not, however, address quality

of care. Data was not collected to allow for examination of differences in outcomes or whether a diagnosis had been found for each of the PGW veterans. Future studies might explore the lengths of stay and numbers of consults in relation to the final diagnosis applied to each patient. Further investigation might also include the effects of numbers of consults on patients' conditions a year after discharge. It is possible that cost savings realized by shorter lengths of stay and fewer consults may be reduced if patients are continuously accessing the system for further complications related to a misdiagnosis.

The political climate, and how it may have effected length of stays in order to speed up completion of the CCEP evaluations also was not taken into consideration in this study. There may be a correlation between the two that would warrant investigation in the future.

The politically charged nature of this program leaves little doubt that these CCEP medical records will be studied many more times. This study, as well as many others, may have benefited from better documentation. Enhanced attention to detail would improve the quality of documentation in these PGW medical records. Ward personnel would benefit from a review of proper documentation

techniques, particularly in regards to forms that may be unique to medical record keeping in the military.

APPENDIX A

PGW ILLNESSES: WORKING DEFINITION

Major Criteria:

1. Patient was in the theater of operation (PGW) between 8 August 1990 and 31 July 1991.
2. New onset of a persistent or relapsing, debilitating illness described by any number of these minor criteria, severe enough to substantially reduce the patient's average daily activity for at least six months.
3. Exclusion by thorough evaluation of other clinical conditions which may produce similar symptoms as listed below.

Minor Criteria:

1. Fatigue
2. Arthralgias or myalgias to include lower back pain
3. Headache
4. Abdominal pain or diarrhea I intermittent, non-bloody)
5. Persistent cough and/or dyspnea
6. Neuropsychologic complaints such as impaired memory, difficulty concentrating, depressed mood, and easy irritability
7. Sleep disturbances (insomnia or hypersomnia)
8. Fever, low grade (usually less than 100.8 degrees F)
9. Weight loss
10. Skin rash

Note: Minor criteria need not all be present concurrently.

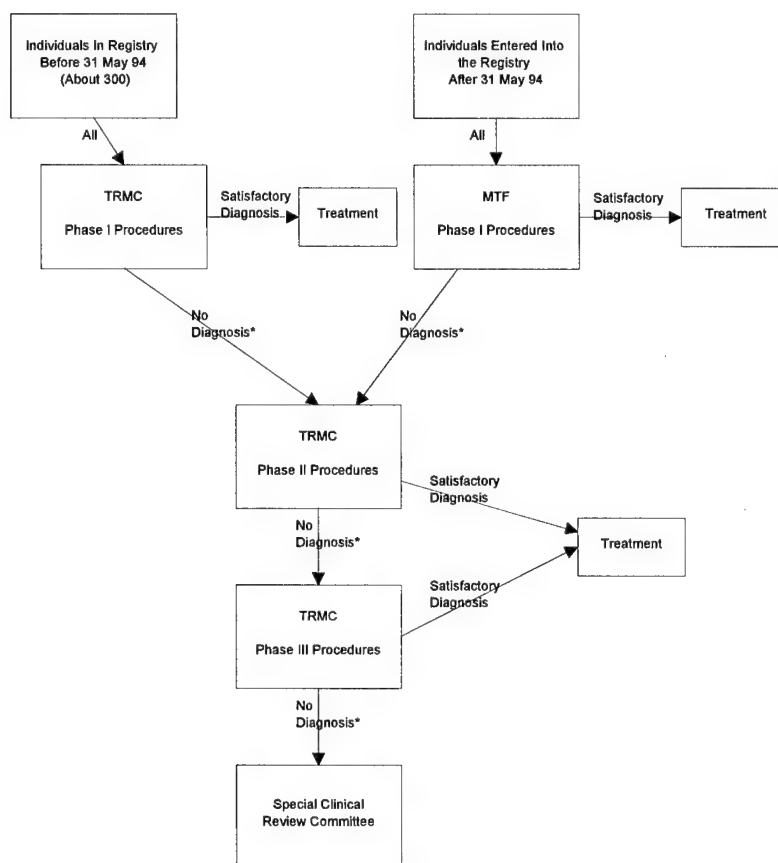
Exclusion of Other Diagnoses:

- Autoimmune disorders (e.g., SLE, Rheumatoid arthritis)
- Chronic bacterial disease (e.g., endocarditis, Lyme, TB, Brucellosis)
- Other infections (e.g., HIV, Histoplasmosis, Coccidiomycosis)

- Chronic inflammation (e.g., sarcoid, Wegener's, chronic hepatitis)
- Drug dependence I e.g., alcohol, benzodiazepines, opiates, cocaine)
- Endocrine disorders (e.g., hypothyroidism, adrenal insufficiency, diabetes)
- Malignancy (e.g., lymphoma, lung)
- Medication side effects
- Neuromuscular disorders (e.g., multiple sclerosis, myasthenia gravis)
- Parasitic diseases (e.g., toxin, Amebiasis, giardiasis, helminthiasis)
- Toxic agents (e.g., solvents, pesticides, heavy metals)
- Preexisting psychosis (psychotic or bipolar depression, schizophrenia)

APPENDIX B

COMPREHENSIVE CLINICAL EVALUATION PROGRAM PROTOCOL



*Diagnosis is not established to the satisfaction of either the physician or the patient.

TRMC: Tricare Regional Medical Center
MTF: Military Treatment Facility

APPENDIX C

PHASE II EVALUATION: SUPPLEMENTAL BASELINE LABORATORY TESTS AND CONSULTATIONS

Laboratory Tests

| | | |
|----------------------|--------------------------|--------------|
| CBC | HIV Testing | Lyme Titers* |
| CD4/CD8 Ratio* | Sedimentation Rate (ESR) | VDRL |
| Hepatitis B Serology | Stool for O and P** | Urinalysis |
| C-Reactive Protein | Serology for: | |
| CPK | Brucellosis* | |
| B12 and Folate | Q Fever* | |
| Thyroid Functions | Fluorescent ANA | |
| Rheumatoid Factor | Serum Immunoglobulins* | |

TB skin test (PPD)

CXR

Consults

Neurology: Screening Evaluation, EEG**

Infectious Disease: Screening Evaluation

Dental: Screening Evaluation**

Psychiatry:

Physician Administered Instruments

Structured Clinical Interview for DSMIII-R (SCID)

Clinician Administered PTSD Scale (CAPS)

Self-Administered Instruments

Combat Exposure Scale Impact Event Scale Mississippi Scale

Traumatic Stress Schedule Beck Depression Index Social Network

MOS-Sleep, Sex, Social Support

* Deleted from the protocol after 17 January 95.

** Ordered on a case-by-case basis after 17 January 95.

APPENDIX D

PHASE III EVALUATIONS

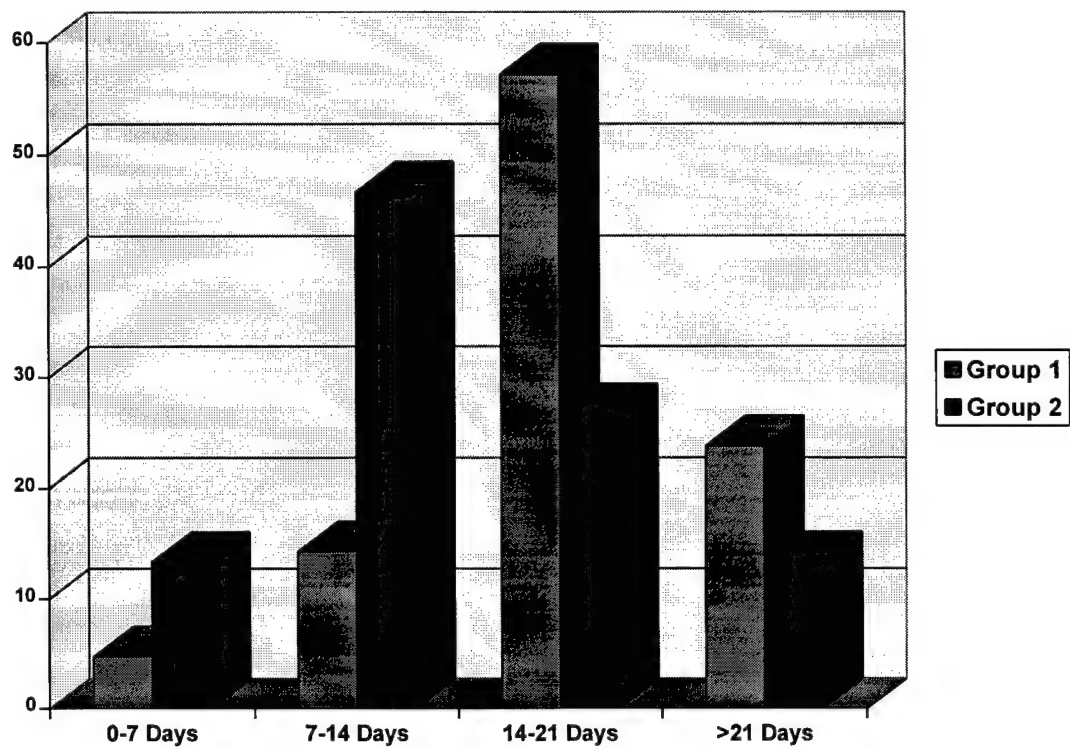
Special Examinations On a Case-by-Case Basis

| | | |
|---|--------------------------------------|--|
| <u>Diarrhea</u> | <u>Abdominal Pain</u> | <u>Headache</u> |
| GI Consult | GI Consult | MRI-Head |
| Stool for O&P | EGD with Biopsy/ Aspiration | LP: including VDRL, oligoclonal IGC, and myelin basic protein |
| Stool Leukocytes | Colonoscopy w/ Biopsy | |
| Stool Culture | CT Abdomen | |
| Stool Volume | UGI w/ small bowel follow-through | |
| Colonoscopy w/ Biopsies | | |
| EGD with Biopsy Aspiration | | |
| <u>Muscle Aches/Numbness</u> | <u>Chronic Fatigue</u> | <u>Joint Pain</u> |
| EMG/NCV | Epstein Bar Virus-IgG, EBNA, VCA* | Rheumatology Consult* |
| | Polysomnography with MSLT | |
| | Leishmaniasis serology* | |
| <u>Chronic Cough or SOB</u> | <u>Skin Rash</u> | <u>Vertigo/Tinnitus</u> |
| Pulmonary Consult | Dermatology Consult | Audiogram |
| Pulmonary Function Tests w/ Exercise ABG | | BAER |
| Consider Bronchoscopy/ Biopsy/Lavage | | ENG |
| Methacholine Challenge if PFTs normal | | |
| <u>Chest pain/Palpitations</u> | <u>Memory Loss</u> | |
| ECG | MRI of the Head | |
| Stress Test | Lumbar Puncture | |
| Holter Monitor | | |

* Deleted from the protocol after 17 January 95.

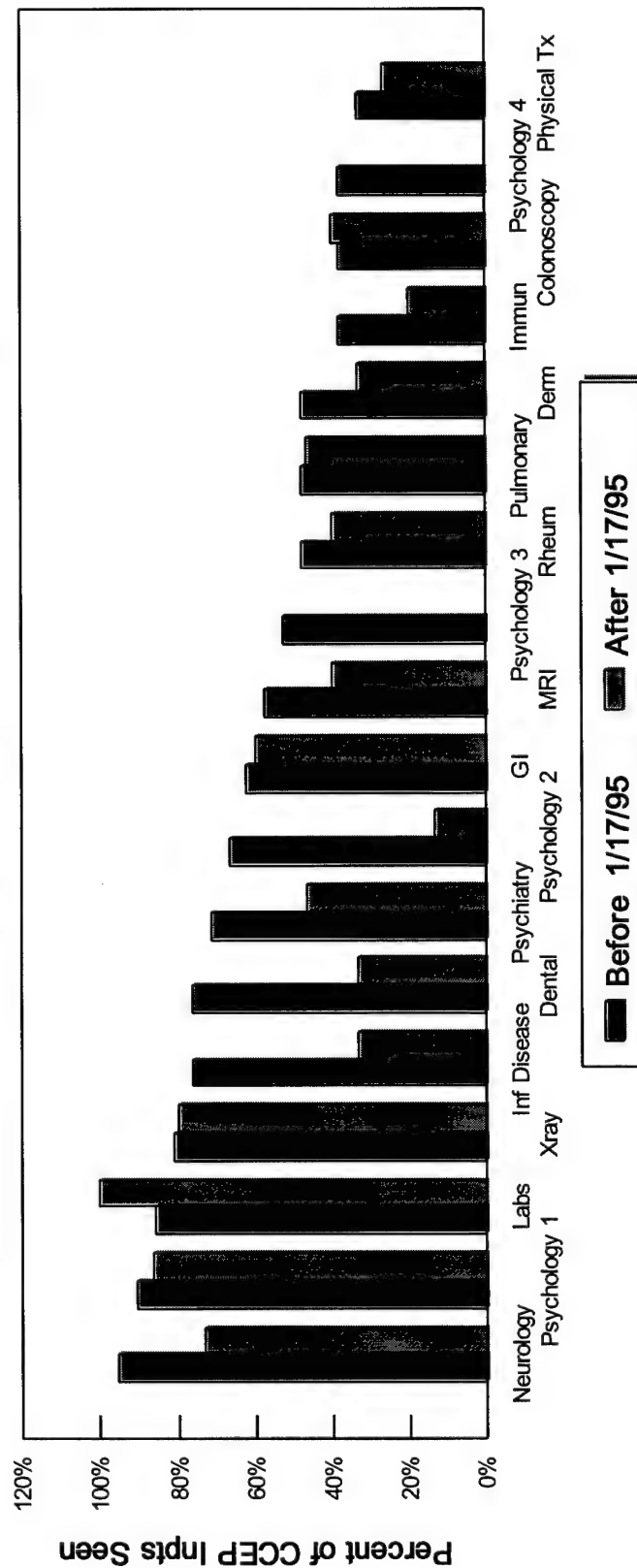
APPENDIX E

FREQUENCY DISTRIBUTION: LENGTHS OF STAY



APPENDIX F

SERVICES RECEIVING THE MOST CONSULTS



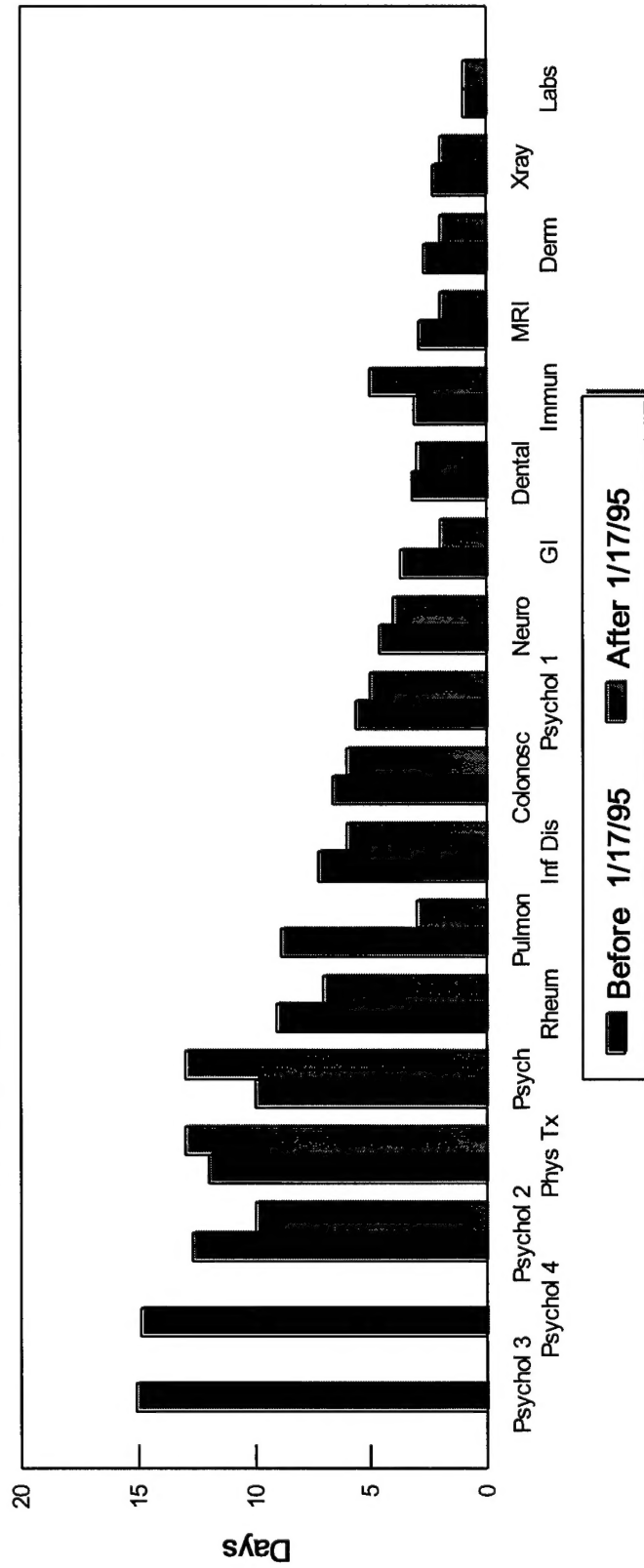
APPENDIX G

CONSULTATION WAIT TIMES (IN DAYS)

| | Mean Grp1 | Std Dev | Mean Grp2 | Std Dev | Mean All | Std Dev All |
|---------------------------|-----------|---------|-----------|---------|----------|-------------|
| Psychology 3 | 14.92 | 7.45 | 0.00 | 0.00 | 14.92 | 7.45 |
| Psychology 4 | 14.78 | 6.68 | 0.00 | 0.00 | 14.78 | 6.68 |
| Psychology 5 | 14.00 | 3.21 | 0.00 | 0.00 | 14.00 | 3.21 |
| Psychology 2 | 12.64 | 7.47 | 10.00 | 4.00 | 12.06 | 7.18 |
| Dietary | 10.50 | 10.34 | 4.50 | 2.60 | 8.49 | 8.69 |
| Psychiatry | 10.00 | 3.54 | 12.57 | 3.81 | 10.48 | 3.82 |
| Rheumatology | 9.10 | 6.92 | 7.33 | 1.37 | 8.39 | 5.60 |
| Pulmonary | 8.90 | 8.12 | 2.57 | 2.92 | 6.29 | 7.21 |
| Infectious Disease | 7.25 | 3.54 | 5.80 | 2.79 | 6.77 | 3.44 |
| Allergy | 5.83 | 3.48 | 3.50 | 2.06 | 4.86 | 3.21 |
| Psychology 1 | 5.68 | 5.15 | 5.08 | 2.95 | 5.44 | 4.40 |
| EEG | 5.38 | 3.41 | 0.00 | 0.00 | 5.38 | 3.41 |
| CT | 5.33 | 2.87 | 5.33 | 2.87 | 5.33 | 2.87 |
| ENT | 5.00 | 3.03 | 8.67 | 5.73 | 5.90 | 4.61 |
| Neurology | 4.65 | 2.97 | 4.00 | 2.34 | 4.38 | 2.78 |
| Ophthalmology | 3.80 | 2.48 | 7.17 | 8.09 | 5.25 | 6.43 |
| GI | 3.69 | 2.97 | 2.44 | 1.50 | 3.19 | 2.55 |
| Dental | 3.19 | 3.38 | 3.40 | 2.58 | 3.24 | 3.21 |
| Immunology | 3.13 | 2.71 | 4.67 | 1.89 | 3.45 | 2.61 |
| MRI | 2.92 | 3.33 | 2.17 | 2.11 | 2.71 | 3.00 |
| Dermatology | 2.70 | 1.55 | 2.40 | 2.06 | 2.54 | 1.74 |
| Xray | 2.29 | 3.66 | 1.75 | 3.00 | 2.13 | 3.41 |
| Labs | 1.00 | 0.82 | 0.93 | 2.08 | 0.97 | 1.53 |

APPENDIX H

WAITING TIMES FOR CONSULTATIONS



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